

SEQUENCE LISTING

- 5 (1) GENERAL INFORMATION:
- (i) APPLICANT: GEFTER, Malcolm L. et al.
- 10 (ii) TITLE OF INVENTION: A HUMAN T CELL REACTIVE FELINE PROTEIN
(TFRP)
ISOLATED FROM HOUSE DUST AND USES THEREFOR
- (iii) NUMBER OF SEQUENCES: 93
- 15 (iv) CORRESPONDENCE ADDRESS:
(A) ADDRESSEE: IMMULOGIC PHARMACEUTICAL CORPORATION
(B) STREET: 610 LINCOLN STREET
(C) CITY: WALTHAM
(D) STATE: Massachusetts
20 (E) COUNTRY: USA
(F) ZIP: 02145
- (v) COMPUTER READABLE FORM:
25 (A) MEDIUM TYPE: Floppy disk
(B) COMPUTER: IBM PC compatible
(C) OPERATING SYSTEM: PC-DOS/MS-DOS
(D) SOFTWARE: ASCII text
- (vi) CURRENT APPLICATION DATA:
30 (A) APPLICATION NUMBER:
(B) FILING DATE:
(C) CLASSIFICATION:
- (vii) PRIOR APPLICATION DATA:
35 (A) APPLICATION NUMBER: 07/807,529
(B) FILING DATE: December 13, 1991
(C) CLASSIFICATION:
- (viii) ATTORNEY/AGENT INFORMATION:
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- (2) INFORMATION FOR SEQ ID NO:1:
- 50 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 418 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
55 (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: cDNA
- 60 (ix) FEATURE:
(A) NAME/KEY: CDS
(B) LOCATION: 2..283
- 65 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

C TGC ATC ATG AAG GGG GCT CGT GTT CTC GTG CTT CTC TGG GCT GCC
46

Cys Ile Met Lys Gly Ala Arg Val Leu Val Leu Leu Trp Ala Ala
1 5 10 15
5 TTT CTC TTG ATC TGG GGT GGA AAT TGT GAA ATT TGC CCA GCC GTG AAG
94
Leu Leu Leu Ile Trp Gly Gly Asn Cys Glu Ile Cys Pro Ala Val Lys
20 25 30
10 AGG GAT GTT GAC CTA TTC CTG ACG GGA ACC CCC GAC GAA TAT GTT GAG
142
Arg Asp Val Asp Leu Phe Leu Thr Gly Thr Pro Asp Glu Tyr Val Glu
35 40 45
15 CAA GTG GCA CAA TAC AAA GCA CTA CCT GTA GTA TTG GAA AAT GCC AGA
190
Gln Val Ala Gln Tyr Lys Ala Leu Pro Val Val Leu Glu Asn Ala Arg
50 55 60
20 ATA CTG AAG AAC TGC GTT GAT GCA AAA ATG ACA GAA GAG GAT AAG GAG
238
Ile Leu Lys Asn Cys Val Asp Ala Lys Met Thr Glu Glu Asp Lys Glu
65 70 75
25 AAT GCT CTC AGC TTG CTG GAC AAA ATA TAC ACA AGT CCT CTG TGT
283
Asn Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu Cys
80 85 90
30 TAAAGGAGCC ATCACTGCCA GGAGCCCTAA GGAAGCCACT GAACTGATCA CTAAGTAGTC
343
TCAGCAGCCT GCCATGTCCA GGTGTCTTAC TAGAGGATTC CAGCAATAAA AGCCTGGCAA
403
35 TTCAAACAAA AAAAA
418

(2) INFORMATION FOR SEQ ID NO:2:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 94 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

50 Cys Ile Met Lys Gly Ala Arg Val Leu Val Leu Leu Trp Ala Ala Leu
1 5 10 15
Leu Leu Ile Trp Gly Gly Asn Cys Glu Ile Cys Pro Ala Val Lys Arg
20 25 30
55 Asp Val Asp Leu Phe Leu Thr Gly Thr Pro Asp Glu Tyr Val Glu Gln
35 40 45
60 Val Ala Gln Tyr Lys Ala Leu Pro Val Val Leu Glu Asn Ala Arg Ile
50 55 60
Leu Lys Asn Cys Val Asp Ala Lys Met Thr Glu Glu Asp Lys Glu Asn
65 70 75 80
65 Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu Cys
85 90

(2) INFORMATION FOR SEQ ID NO:3:

(i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 420 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:
 (A) NAME/KEY: CDS
 (B) LOCATION: 2..301

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

G GCC TGG CGG TGC TCC TGG AAA AGG ATG TTA GAC GCA GCC CTC CCA
 46
 Ala Trp Arg Cys Ser Trp Lys Arg Met Leu Asp Ala Ala Leu Pro
 1 5 10 15
 CCC TGC CCT ACT GTT GCG GCC ACA GCA GAT TGT GAA ATT TGC CCA GCC
 94
 Pro Cys Pro Thr Val Ala Ala Thr Ala Asp Cys Glu Ile Cys Pro Ala
 20 25 30
 GTG AAG AGG GAT GTT GAC CTA TTC CTG ACG GGA ACC CCC GAC GAA TAT
 142
 Val Lys Arg Asp Val Asp Leu Phe Leu Thr Gly Thr Pro Asp Glu Tyr
 35 40 45
 GTT GAG CAA GTG GCA CAA TAC AAA GCA CTA CCT GTA GTA TTG GAA AAT
 190
 Val Glu Gln Val Ala Gln Tyr Lys Ala Leu Pro Val Val Leu Glu Asn
 50 55 60
 GCC AGA ATA CTG AAG AAC TGC GTT GAT GCA AAA ATG ACA GAA GAG GAT
 238
 Ala Arg Ile Leu Lys Asn Cys Val Asp Ala Lys Met Thr Glu Glu Asp
 65 70 75
 AAG GAG AAT GCT CTC AGC TTG CTG GAC AAA ATA TAC ACA AGT CCT CTG
 286
 Lys Glu Asn Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu
 80 85 90 95
 TGT TAA AGG AGC CAT CACTGCCAGG AGCCCTAAGG AAGCCACTGA ACTGATCACT
 341
 Cys
 AAGTAGTCTC AGCAGCCTGC CATGTCCAGG TGTCTTACTA GAGGATTCCA GCAATAAAAG
 401
 CCTTGCAATT CAAACAAAA
 420

(2) INFORMATION FOR SEQ ID NO:4:

(i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 100 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

5 Ala Trp Arg Cys Ser Trp Lys Arg Met Leu Asp Ala Ala Leu Pro Pro
1 5 10 15
Cys Pro Thr Val Ala Ala Thr Ala Asp Cys Glu Ile Cys Pro Ala Val
20 25 30
10 Lys Arg Asp Val Asp Leu Phe Leu Thr Gly Thr Pro Asp Glu Tyr Val
35 40 45
Glu Gln Val Ala Gln Tyr Lys Ala Leu Pro Val Val Leu Glu Asn Ala
50 55 60
15 Arg Ile Leu Lys Asn Cys Val Asp Ala Lys Met Thr Glu Glu Asp Lys
65 70 75 80
20 Glu Asn Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu Cys
85 90 95

(2) INFORMATION FOR SEQ ID NO:5:

25 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 476 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
30 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

35 (ix) FEATURE:
(A) NAME/KEY: CDS
(B) LOCATION: 1..335

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

40 T GAC ACG ATG AGG GGG GCA CTG CTT GTG CTG GCA TTG CTG GTG ACC
46
Asp Thr Met Arg Gly Ala Leu Leu Val Leu Ala Leu Leu Val Thr
1 5 10 15
45 CAA GCG CTG GGC GTC AAG ATG GCG GAA ACT TGC CCC ATT TTT TAT GAC
94
Gln Ala Leu Gly Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp
20 25 30
50 GTC TTT TTT GCG GTG GCC AAT GGA AAT GAA TTA CTG TTG GAC TTG TCC
142
Val Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser
35 40 45
55 CTC ACA AAA GTC AAT GCT ACT GAA CCA GAG AGA ACA GCC ATG AAA AAA
190
Leu Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys
50 55 60
60 ATC CAG GAT TGC TAC GTG GAG AAC GGA CTC ATA TCC AGG GTC TTG GAT
238
Ile Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp
65 70 75
65 GGA CTA GTC ATG ACA ACC ATC AGC TCC AGC AAA GAT TGC ATG GGT GAA
286
Gly Leu Val Met Thr Thr Ile Ser Ser Ser Lys Asp Cys Met Gly Glu

80 85 90 95
 GCA GTT CAG AAC ACC GTA GAA GAT CTC AAG CTG AAC ACT TTG GGG AGA
 334
 5 Ala Val Gln Asn Thr Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg
 100 105 110
 TGAATCTTTG CCACTGATGC CCCTTCTGAG CCCCATCCTC CTGCCCTGTT CTTTACACCT
 394
 10 AAAGCTGGAA TCCAGACACC TGCCTCACC TAATTCACCTC TCAATCAGGC TGACTAGAAT
 454
 15 AAAATAACTG CATCTTAAAA AA
 476

(2) INFORMATION FOR SEQ ID NO:6:

20 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 111 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear
 25 (ii) MOLECULE TYPE: protein
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:
 30 Asp Thr Met Arg Gly Ala Leu Leu Val Leu Ala Leu Leu Val Thr Gln
 1 5 10 15
 Ala Leu Gly Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val
 20 25 30
 35 Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu
 35 40 45
 Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile
 50 55 60
 40 Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly
 65 70 75 80
 45 Leu Val Met Thr Thr Ile Ser Ser Ser Lys Asp Cys Met Gly Glu Ala
 85 90 95

005160 10223300

Val Gln Asn Thr Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg
100 105 110

(2) INFORMATION FOR SEQ ID NO:7:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 469 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

- (ix) FEATURE:
(A) NAME/KEY: CDS
(B) LOCATION: 1..327

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

GAC ACG ATG AGG GGG GCA CTG CTT GTG CTG GCA TTG CTG GTG ACC CAA
48
25 Asp Thr Met Arg Gly Ala Leu Leu Val Leu Ala Leu Leu Val Thr Gln
1 5 10 15
GCG CTG GGC GTC AAG ATG GCG GAG ACG TGC CCC ATT TTT TAT GAC GTC
96
30 Ala Leu Gly Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val
20 25 30
TTT TTT GCG GTG GCC AAT GGA AAT GAA TTA CTG TTG GAC TTG TCC CTC
144
35 Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu
35 40 45
ACA AAA GTC AAT GCT ACT GAA CCA GAG AGA ACA GCC ATG AAA AAA ATC
192
40 Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile
50 55 60
CAG GAT TGC TAC GTG GAG AAC GGA CTC ATA TCC AGG GTC TTG GAT GGA
240
45 Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly
65 70 75 80
CTA GTC ATG ATA GCC ATC AAC GAA TAT TGC ATG GGT GAA GCA GTT CAG
288
50 Leu Val Met Ile Ala Ile Asn Glu Tyr Cys Met Gly Glu Ala Val Gln
85 90 95
AAC ACC GTA GAA GAT CTC AAG CTG AAC ACT TTG GGG AGA TGAATCTTTG
337
55 Asn Thr Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg
100 105
CCACTGATGC CCCTTCTGAG CCCCATCCTC CTGTCCTGTT CTTTACACCT AAAGCTGGAA
397
60 TCCAGACACC TGTCTCACC TAATTCACCT TCAATCAGGC TGACTIONAAT AAAATAACTG
457
CATCTTAAAA AA
469
65

(2) INFORMATION FOR SEQ ID NO:8:

(i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 109 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

5

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

10 Asp Thr Met Arg Gly Ala Leu Leu Val Leu Ala Leu Leu Val Thr Gln
 1 5 10 15
 Ala Leu Gly Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val
 20 25 30
 15 Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu
 35 40 45
 Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile
 20 50 55 60
 Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly
 65 70 75 80
 25 Leu Val Met Ile Ala Ile Asn Glu Tyr Cys Met Gly Glu Ala Val Gln
 85 90 95
 Asn Thr Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg
 100 105
 30

(2) INFORMATION FOR SEQ ID NO:9:

(i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 465 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

35

(ii) MOLECULE TYPE: cDNA

40

(ix) FEATURE:

(A) NAME/KEY: CDS
 (B) LOCATION: 1..291

45

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

50 GAC ACG ATG AGG GGG GCA CTG CTT GTG CTG GCA TTG CTG GTG ACC CAA
 48
 Asp Thr Met Arg Gly Ala Leu Leu Val Leu Ala Leu Leu Val Thr Gln
 1 5 10 15
 55 GCG CTG GGC GTC AAG ATG GCG GAG ACG TGC CCC ATT TTT TAT GAC GTC
 96
 Ala Leu Gly Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val
 20 25 30

TTT TTT GCG GTG GCC AAT GGA AAT GAA TTA CTG TTG GAC TTG TCC CTC
 144
 Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu
 35 40 45
 5
 ACA AAA GTC AAT GCT ACT GAA CCA GAG AGA ACA GCC ATG AAA AAA ATC
 192
 Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile
 50 55 60
 10
 CAG GAT TGC TAC GTG GAG AAC GGA CTC ATA TCC AGG GTC TTG GAT GGA
 240
 Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly
 65 70 75 80
 15
 CTA GCC ATG CCA TCA ACG AAT ATT GCA TGG GTG AAG CAG TTC AGA ACA
 288
 Leu Ala Met Pro Ser Thr Asn Ile Ala Trp Val Lys Gln Phe Arg Thr
 85 90 95
 20
 CCG TAGAAGATCT CAAGCTGAAC ACTTTGGGGA GATGAATCTT TGCCACTGAT
 341
 Pro
 25
 GCCCCTTCTG AGCCCCATCC TCCTGTCCTG TTCTTTACAC CTAAAGCTGG AATCCAGACA
 401
 30
 CCTGTCTCTCA CCTAATTCAC TCTCAATCAG GCTGACTAGA ATAAAATAAC TGCATCTTAA
 461
 AAAA
 465
 35
 (2) INFORMATION FOR SEQ ID NO:10:
 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 97 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear
 (ii) MOLECULE TYPE: protein
 45
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:
 Asp Thr Met Arg Gly Ala Leu Leu Val Leu Ala Leu Leu Val Thr Gln
 1 5 10 15
 50 Ala Leu Gly Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val
 20 25 30
 Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu
 35 40 45
 55 Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile
 50 55 60
 60 Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly
 65 70 75 80
 Leu Ala Met Pro Ser Thr Asn Ile Ala Trp Val Lys Gln Phe Arg Thr
 85 90 95
 65 Pro

(2) INFORMATION FOR SEQ ID NO:11:

(i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 94 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:

Cys Ile Met His Gly Ala Arg Val Leu Val Leu Leu Trp Ala Ala Leu
 -20 -15 -10

Leu Leu Ile Trp Gly Gly Asn Cys Glu Ile Cys Pro Ala Val Lys Arg
 -5 -1 1 5

Asp Val Asp Leu Phe Leu Thr Gly Thr Pro Asp Glu Tyr Val Glu Gln
 10 15 20

Val Ala Gln Tyr Lys Ala Leu Pro Val Val Leu Glu Asn Ala Arg Ile
 25 25 30 35

Leu Lys Asn Cys Val Asp Ala Lys Met Thr Glu Asp Lys Glu Asn
 40 45 50 55

Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu Cys
 60 65

(2) INFORMATION FOR SEQ ID NO:12:

(i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 96 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

Ala Trp Arg Cys Ser Trp Lys Arg Met Leu Asp Ala Ala Leu Pro Pro
 -25 -20 -15

Cys Pro Thr Asx Ala Ala Thr Ala Asp Cys Glu Ile Cys Pro Ala Val
 -10 -5 -1 1 5

Lys Arg Asp Val Asp Leu Phe Leu Thr Gly Thr Pro Asp Glu Tyr Val
 10 15 20

Glu Gln Val Ala Gln Tyr Lys Ala Leu Pro Val Val Leu Glu Asn Ala
 25 30 35

Arg Ile Leu Lys Asn Cys Val Asp Ala Lys Met Thr Glu Glu Asp Lys
 40 45 50

Glu Asn Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu Cys
 55 60 65 70

(2) INFORMATION FOR SEQ ID NO:13:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 111 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

5 (ii) MOLECULE TYPE: peptide
(v) FRAGMENT TYPE: internal

10 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:13:

Asp Thr Met Arg Gly Ala Leu Leu Val Leu Ala Leu Leu Val Thr Gln
-15 -10 -5
15 Ala Leu Gly Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val
-1 1 5 10
20 Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu
15 20 25
Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile
30 35 40
25 Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly
45 50 55 60
Leu Val Met Thr Thr Ile Ser Ser Ser Lys Asp Cys Met Gly Glu Ala
65 70 75
30 Val Gln Asn Thr Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg
80 85 90

35 (2) INFORMATION FOR SEQ ID NO:14:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 90 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

40 (ii) MOLECULE TYPE: peptide
45 (v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:14:

50 Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val Phe Phe
1 5 10 15
Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu Thr Lys
20 25 30
55 Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile Gln Asp
35 40 45
60 Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly Leu Val
50 55 60
Met Ile Ala Ile Asn Glu Tyr Cys Met Gly Glu Ala Val Gln Asn Thr
65 65 70 75
Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg
80 85 90

(2) INFORMATION FOR SEQ ID NO:15:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 51 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:15:

Ser Leu Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys
1 5 10 15
Lys Ile Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu
20 25 30
Asp Gly Leu Val Met Pro Ser Thr Asn Ile Ala Trp Val Lys Gln Phe
35 40 45
Arg Thr Pro
50

(2) INFORMATION FOR SEQ ID NO:16:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 82 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(iv) FEATURE:
(A) NAME/KEY: misc_feature
(B) LOCATION: 65
(D) OTHER INFORMATION: /label=Xaa is Ile or Thr

(iv) FEATURE:
(A) NAME/KEY: misc_feature
(B) LOCATION: 66
(D) OTHER INFORMATION: /label=Xaa is Ala or Thr

(iv) FEATURE:
(A) NAME/KEY: misc_feature
(B) LOCATION: 68
(D) OTHER INFORMATION: /label=Xaa is Asn or Ser

(iv) FEATURE:
(A) NAME/KEY: misc_feature
(B) LOCATION: 69
(D) OTHER INFORMATION: /label=Xaa is Glu or Ser

(iv) FEATURE:
(A) NAME/KEY: misc_feature
(B) LOCATION: 80
(D) OTHER INFORMATION: /label=Xaa is Ala or Thr

(iv) FEATURE:
(A) NAME/KEY: misc_feature
(B) LOCATION: 81
(D) OTHER INFORMATION: /label=Xaa is Met or Val

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:16:

5 Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val Phe Phe Ala
1 5 10 15
Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu Thr Lys Val
20 25 30
10 Xaa Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile Gln Asp Cys
35 40 45
Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly Leu Val Met
50 55 60
15 Xaa Xaa Ile Xaa Xaa Lys Asp Cys Met Gly Glu Ala Val Gln Asn Xaa
65 70 75 80
20 Xaa Glu

(2) INFORMATION FOR SEQ ID NO:17:

25 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 27 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

30 (ii) MOLECULE TYPE: peptide
(v) FRAGMENT TYPE: internal

35 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:17:

40 Lys Arg Asp Val Asp Leu Phe Leu Thr Gly Thr Pro Asp Glu Tyr Val
1 5 10 15
Glu Gln Val Ala Gln Tyr Lys Ala Leu Pro Val
20 25

(2) INFORMATION FOR SEQ ID NO:18:

45 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 27 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

50 (ii) MOLECULE TYPE: peptide
(v) FRAGMENT TYPE: internal

55 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:18:

60 Lys Ala Leu Pro Val Val Leu Glu Asn Ala Arg Ile Leu Lys Asn Cys
1 5 10 15
Val Asp Ala Lys Met Thr Glu Glu Asp Lys Glu
20 25

65 (2) INFORMATION FOR SEQ ID NO:19:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 26 amino acids

(B) TYPE: amino acid
(D) TOPOLOGY: linear

5 (ii) MOLECULE TYPE: peptide
(v) FRAGMENT TYPE: internal

10 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:19:

15 Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu
1 5 10 15

005760 1022900

Thr Lys Val Asn Ala Thr Glu Pro Glu Arg
20 25

(2) INFORMATION FOR SEQ ID NO:20:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 19 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:20:

Glu Glu Asp Lys Glu Asn Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr
1 5 10 15
Ser Pro Leu

(2) INFORMATION FOR SEQ ID NO:21:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 19 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:21:

Met Gly Glu Ala Val Gln Asn Thr Val Glu Asp Leu Lys Leu Asn Thr
1 5 10 15
Leu Gly Arg

(2) INFORMATION FOR SEQ ID NO:22:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 16 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:22:

Glu Glu Asp Lys Glu Asn Ala Leu Ser Leu Leu Asp Lys Ile Tyr
1 5 10 15
Thr

(2) INFORMATION FOR SEQ ID NO:23:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 14 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:23:

Asn Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu
1 5 10

(2) INFORMATION FOR SEQ ID NO:24:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:24:

Phe Tyr Asp Val Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu
1 5 10 15
Asp

(2) INFORMATION FOR SEQ ID NO:25:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 18 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:25:

Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu Thr Lys Val Asn Ala
1 5 10 15
Thr Glu

(2) INFORMATION FOR SEQ ID NO:26:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 18 amino acids
(B) TYPE: amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

5 (v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:26:

10 Ser Leu Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys
1 5 10 15

15 Lys Ile

(2) INFORMATION FOR SEQ ID NO:27:

20 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

25 (ii) MOLECULE TYPE: peptide
(v) FRAGMENT TYPE: internal

30 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:27:

35 Glu Arg Thr Ala Met Lys Lys Ile Gln Asp Cys Tyr Val Glu Asn Gly
1 5 10 15

Leu

40 (2) INFORMATION FOR SEQ ID NO:28:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 18 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

45 (ii) MOLECULE TYPE: peptide
(v) FRAGMENT TYPE: internal

50 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:28:

55 Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly
1 5 10 15

Leu Val

60 (2) INFORMATION FOR SEQ ID NO:29:

65 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 20 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

5

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:29:

10 Ile Ser Arg Val Leu Asp Gly Leu Val Met Thr Thr Ile Ser Ser Ser
1 5 10 15
Lys Asp Cys Met
20

15 (2) INFORMATION FOR SEQ ID NO:30:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 18 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

20

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

25

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:30:

30 Ile Ser Arg Val Leu Asp Gly Leu Val Met Ile Ala Ile Asn Glu Asp
1 5 10 15
Cys Met

35

(2) INFORMATION FOR SEQ ID NO:31:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 30 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

40

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

45

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:31:

50

Met Thr Thr Ile Ser Ser Ser Lys Asp Cys Met Gly Glu Ala Val Gln
1 5 10 15

55

Asn Thr Glu Val Glu Leu Asp Lys Leu Asn Thr Leu Gly Phe
20 25 30

(2) INFORMATION FOR SEQ ID NO:32:

60

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 28 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

65

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

5 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:32:
Met Ile Ala Ile Asn Glu Asp Cys Met Gly Glu Ala Val Gln Asn Thr
1 5 10 15
10 Glu Val Glu Leu Asp Lys Leu Asn Thr Leu Gly Phe
20 25

(2) INFORMATION FOR SEQ ID NO:33:
15 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 24 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
20 (D) TOPOLOGY: linear
(ii) MOLECULE TYPE: cDNA

25 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:33:
TATCGATGAA ATTTGYCCWG CWGT
24

30 (2) INFORMATION FOR SEQ ID NO:34:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 19 base pairs
(B) TYPE: nucleic acid
35 (C) STRANDEDNESS: single
(D) TOPOLOGY: linear
(ii) MOLECULE TYPE: cDNA

40 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:34:
GCTCGAGRTC YTCYTCWGT
45 19

(2) INFORMATION FOR SEQ ID NO:35:
50 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 31 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
55 (D) TOPOLOGY: linear
(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:35:
60 GGAATTCATC GATGTGAAGA GGGATCTATT C
31

65 (2) INFORMATION FOR SEQ ID NO:36:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 32 base pairs

(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

5 (ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:36:
10 GGATCGATGA ATTCTATTCC TGACGGGAAC CC
32

15 (2) INFORMATION FOR SEQ ID NO:37:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 20 base pairs
(B) TYPE: nucleic acid
20 (C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

25 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:37:
GGATTCTCTA GACTGCAGGT
30 20

(2) INFORMATION FOR SEQ ID NO:38:

35 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 21 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
40 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

45 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:38:
GGAATTCTCT AGACTGCAGG T
21

50 (2) INFORMATION FOR SEQ ID NO:39:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 20 base pairs
(B) TYPE: nucleic acid
55 (C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

60 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:39:
GAYGARTAYG THGARCARGT
65 20

(2) INFORMATION FOR SEQ ID NO:40:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 27 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:40:

CGGAATTCAA RATGGCNGAR ACDTGYC
27

(2) INFORMATION FOR SEQ ID NO:41:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 33 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:41:

CGGGCTGCAG TARCARTCYT GNATYTTYTT CAT
33

(2) INFORMATION FOR SEQ ID NO:42:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 8 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:42:

Met Lys Lys Ile Gln Asp Cys Tyr
1 5

(2) INFORMATION FOR SEQ ID NO:43:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 31 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:43:

GGATCGATGA ATTCCGGTGGC CAATGGAAAT G
31

5

(2) INFORMATION FOR SEQ ID NO:44:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 21 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

10

(ii) MOLECULE TYPE: cDNA

15

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:44:

ATTACTGTTG GACTTGTCCT T
21

20

(2) INFORMATION FOR SEQ ID NO:45:

(i) SEQUENCE CHARACTERISTICS:

25

(A) LENGTH: 6 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

30

(ii) MOLECULE TYPE: peptide

35

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:45:

40

Leu Leu Leu Asp Leu Ser
1 5

(2) INFORMATION FOR SEQ ID NO:46:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 30 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

50

(ii) MOLECULE TYPE: cDNA

55

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:46:

GGGTCTAGAG GTACCGTCCG ATCGATCATT
30

60

(2) INFORMATION FOR SEQ ID NO:47:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 13 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single

65

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

5

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:47:

10 AATGATCGAT GCT
13

(2) INFORMATION FOR SEQ ID NO:48:

15 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 20 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

20

(ii) MOLECULE TYPE: cDNA

25

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:48:

GGGTCTAGAG GTACCGTCCG
30 20

(2) INFORMATION FOR SEQ ID NO:49:

35 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 35 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

40

(ii) MOLECULE TYPE: cDNA

45

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:49:

CGGGCTCGAG CTGCAGCTGT TCTCTCTGGT TCACT
35 35

50

(2) INFORMATION FOR SEQ ID NO:50:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 6 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

55

(ii) MOLECULE TYPE: peptide

60

(v) FRAGMENT TYPE: internal

65

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:50:

Thr Glu Pro Glu Arg Thr
1 5

(2) INFORMATION FOR SEQ ID NO:51:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 29 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:51:

GGGCTGCAGA TTCTAGTCAG CCTGATTGA
29

(2) INFORMATION FOR SEQ ID NO:52:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 33 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:52:

GGGCTCGAGC TGCAGTTCTT CAGTATTCTG GCA
33

(2) INFORMATION FOR SEQ ID NO:53:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 6 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:53:

Ala Arg Ile Leu Lys Asn
1 5

(2) INFORMATION FOR SEQ ID NO:54:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:54:

5 Glu Ile Thr Pro Ala Val Lys Arg Asp Val Asp Leu Phe Leu Thr Gly
 1 5 10 15
 Thr

10

(2) INFORMATION FOR SEQ ID NO:55:

15 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 17 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

20 (ii) MOLECULE TYPE: peptide
 (v) FRAGMENT TYPE: internal

25 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:55:

30 Asp Val Asp Leu Phe Leu Thr Gly Thr Pro Asp Glu Tyr Val Glu Gln
 1 5 10 15
 Val

35 (2) INFORMATION FOR SEQ ID NO:56:

40 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 19 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

45 (ii) MOLECULE TYPE: peptide
 (v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:56:

50 Asn Ala Arg Ile Leu Lys Asn Cys Val Asp Ala Lys Met Thr Glu Glu
 1 5 10 15
 Asp Lys Glu

55

(2) INFORMATION FOR SEQ ID NO:57:

60 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 27 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

65 (ii) MOLECULE TYPE: peptide
 (v) FRAGMENT TYPE: internal

005760:1822560

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:57:

5 Leu Leu Leu Asp Leu Ser Leu Thr Lys Val Asn Ala Thr Glu Pro Glu
 1 5 10 15
 Arg Thr Ala Met Lys Lys Ile Asp Gln Asp Cys
 20 25
10

(2) INFORMATION FOR SEQ ID NO:58:

15 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 27 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

20 (ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:58:

25 GTCCACGGAC ACAAGTGC GA TATCACC
 27

30 (2) INFORMATION FOR SEQ ID NO:59:

35 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 27 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

40 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:59:

45 GTTGGCTTCC TTCACAGGAC AGGAATT
 27

(2) INFORMATION FOR SEQ ID NO:60:

50 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 18 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

55 (ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

60 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:60:

65 Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val Phe Phe Ala
 1 5 10 15
 Val Ala

(2) INFORMATION FOR SEQ ID NO:61:

(i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 27 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:
 (A) NAME/KEY: CDS
 (B) LOCATION: 10..27

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:61:

GGGGGATCC AAA GCT CTG CCG GTT GTT
 27
 Lys Ala Leu Pro Val Val
 1 5

(2) INFORMATION FOR SEQ ID NO:62:

(i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 6 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:62:

Lys Ala Leu Pro Val Val
 1 5

(2) INFORMATION FOR SEQ ID NO:63:

(i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 90 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:
 (A) NAME/KEY: CDS
 (B) LOCATION: 10..90

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:63:

GGGGGATCC AAA GCT CTG CCG GTT GTT CTG GAA AAC GCT CGT ATC CTG
 48
 Lys Ala Leu Pro Val Val Leu Glu Asn Ala Arg Ile Leu
 1 5 10

AAA AAC TGC GTT GAC GCT AAA ATG ACC GAA GAA GAC AAA GAA
 90
 Lys Asn Cys Val Asp Ala Lys Met Thr Glu Glu Asp Lys Glu
 15 20 25

(2) INFORMATION FOR SEQ ID NO:64:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 27 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

5

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:64:

005578409400

Lys Ala Leu Pro Val Val Leu Glu Asn Ala Arg Ile Leu Lys Asn Cys
1 5 10 15

5 Val Asp Ala Lys Met Thr Glu Glu Asp Lys Glu
20 25

(2) INFORMATION FOR SEQ ID NO:65:

10 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 63 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

15 (ii) MOLECULE TYPE: cDNA

(iv) ANTI-SENSE: YES

20

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:65:

25 CAGAGACAGG TCCAGCAGCA GTTCGTTACC GTTAGCAACA GCGAAGAATT CTTTGTCTTC
60

TTC
63

30 (2) INFORMATION FOR SEQ ID NO:66:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 21 amino acids
(B) TYPE: amino acid
35 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

40 (v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:66:

45 Glu Glu Asp Lys Glu Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu
1 5 10 15

Leu Asp Leu Ser Leu
20

50

(2) INFORMATION FOR SEQ ID NO:67:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 45 base pairs
55 (B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

60 (ii) MOLECULE TYPE: cDNA

(ix) FEATURE:
(A) NAME/KEY: CDS
(B) LOCATION: 1..45

65

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:67:

CTG GAC CTG TCT CTG ACC AAA GTT AAC GCT ACC GAA CCG GAA CGT
45
Leu Asp Leu Ser Leu Thr Lys Val Asn Ala Thr Glu Pro Glu Arg
1 5 10 15

(2) INFORMATION FOR SEQ ID NO:68:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 15 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:68:

Leu Asp Leu Ser Leu Thr Lys Val Asn Ala Thr Glu Pro Glu Arg
1 5 10 15

(2) INFORMATION FOR SEQ ID NO:69:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 54 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(iv) ANTI-SENSE: YES

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:69:

GTCCGGGGTA CCGGTCAGGA ACAGGTCAAC GTCACGTTTA CGTCCGGTT CCGT
54

(2) INFORMATION FOR SEQ ID NO:70:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:70:

Thr Glu Pro Glu Arg Lys Arg Asp Val Asp Leu Phe Leu Thr Gly Thr
1 5 10 15
Pro Asp

(2) INFORMATION FOR SEQ ID NO:71:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 89 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

5 (ix) FEATURE:
(A) NAME/KEY: CDS
(B) LOCATION: 1..63

10 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:71:

ACC GGT ACC CCG GAC GAA TAC GTT GAA CAG GTT GCT CAG TAC AAA GCT
48
Thr Gly Thr Pro Asp Glu Tyr Val Glu Gln Val Ala Gln Tyr Lys Ala
15 1 5 10 15
CTG CCG GTT TAG TAGTCTAGAC TGCAGAAGCT TGGATCCCC
89
Leu Pro Val
20

(2) INFORMATION FOR SEQ ID NO:72:

25 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 19 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

30 (ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:72:

Thr Gly Thr Pro Asp Glu Tyr Val Glu Gln Val Ala Gln Tyr Lys Ala
35 1 5 10 15
Leu Pro Val

40 (2) INFORMATION FOR SEQ ID NO:73:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 44 base pairs
45 (B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

50 (iv) ANTI-SENSE: YES

55 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:73:

GGGGATCCAA GCTTCTGCAG TCTAGACTAC TAAACCGGCA GAGC
44

60 (2) INFORMATION FOR SEQ ID NO:74:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 4 amino acids
65 (B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

5 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:74:

Ala Leu Pro Val
1

10 (2) INFORMATION FOR SEQ ID NO:75:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 41 base pairs
(B) TYPE: nucleic acid
15 (C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

20

(ix) FEATURE:
(A) NAME/KEY: CDS
(B) LOCATION: 9..41

25

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:75:

30 GGGGATCC GAA GAA GAC AAA GAA AAC GCT CTG TCT CTG CTG
41

Glu Glu Asp Lys Glu Asn Ala Leu Ser Leu Leu
1 5 10

35 (2) INFORMATION FOR SEQ ID NO:76:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 11 amino acids
(B) TYPE: amino acid
40 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

45

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:76:

Glu Glu Asp Lys Glu Asn Ala Leu Ser Leu Leu
1 5 10

50

(2) INFORMATION FOR SEQ ID NO:77:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 60 base pairs
55 (B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

60

(iv) ANTI-SENSE: YES

65 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:77:

TTCCAGAACA ACCGGCAGAG CTTTCAGCGG AGAGGTGTAG ATTTTGTCCA GCAGAGACAG
60

(2) INFORMATION FOR SEQ ID NO:78:

5 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 20 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

10 (ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

15 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:78:
Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu Lys Ala Leu Pro
1 5 10 15
Val Val Leu Glu
20 20

(2) INFORMATION FOR SEQ ID NO:79:

25 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 54 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

30 (ii) MOLECULE TYPE: cDNA

(iv) ANTI-SENSE: YES

35 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:79:
TTCAACGGTG TTCTGAACAG CTTACCCAT AACCGGCAGA GCTTTGTACT GAGC
40 54

(2) INFORMATION FOR SEQ ID NO:80:

45 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 18 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

50 (ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

55 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:80:
Ala Gln Tyr Lys Ala Leu Pro Val Met Gly Glu Ala Val Gln Asn Thr
1 5 10 15
60 Val Glu

(2) INFORMATION FOR SEQ ID NO:81:

65 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 65 base pairs
(B) TYPE: nucleic acid

(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

5 (ii) MOLECULE TYPE: cDNA

(ix) FEATURE:
(A) NAME/KEY: CDS
10 (B) LOCATION: 1..45

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:81:

15 CAG AAC ACC GTT GAA GAC CTG AAA CTG AAC ACC CTG GGT CGT TGAATGTAAC
52
Gln Asn Thr Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg
1 5 10 15
20 TGCAGAATTTC CCC
65

(2) INFORMATION FOR SEQ ID NO:82:

25 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 14 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

30 (ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:82:

35 Gln Asn Thr Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg
1 5 10

(2) INFORMATION FOR SEQ ID NO:83:

40 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 20 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

45 (ii) MOLECULE TYPE: cDNA

(ix) FEATURE:
50 (A) NAME/KEY: CDS
(B) LOCATION: 9..20

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:83:

55 GGGGATCC GAA GAA GAC AAA
20
Glu Glu Asp Lys
1
60

(2) INFORMATION FOR SEQ ID NO:84:

65 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 4 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:84:

5 Glu Glu Asp Lys
1

(2) INFORMATION FOR SEQ ID NO:85:

10 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 35 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
15 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(iv) ANTI-SENSE: YES

20

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:85:

25 GGGGAATTCT GCAGTTACAT TCATCTCCCC AAAGT
35

(2) INFORMATION FOR SEQ ID NO:86:

30 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 4 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

35 (ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

40 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:86:

Thr Leu Gly Arg
1

45 (2) INFORMATION FOR SEQ ID NO:87:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 6 amino acids
50 (B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

55

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:87:

60 Leu Val Pro Arg Gly Ser
1 5

(2) INFORMATION FOR SEQ ID NO:88:

65 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 10 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:88:

Met Gly His His His His His His Glu Phe
1 5 10

(2) INFORMATION FOR SEQ ID NO:89:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 6 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:89:

GAATTC
6

(2) INFORMATION FOR SEQ ID NO:90:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 6 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:90:

GGATCC
6

(2) INFORMATION FOR SEQ ID NO:91:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 14 amino acids

(B) TYPE: amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:91:

Met Gly His His His His His His Leu Val Pro Arg Gly Ser
1 5 10

(2) INFORMATION FOR SEQ ID NO:92:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 7 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:92:

Lys Met Ala Glu Thr Cys Pro
1 5

(2) INFORMATION FOR SEQ ID NO:93:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 5 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:93:

Val Ala Asn Gly Asn
1 5